CK5 Kirk knowledge check

Method of joints and sections

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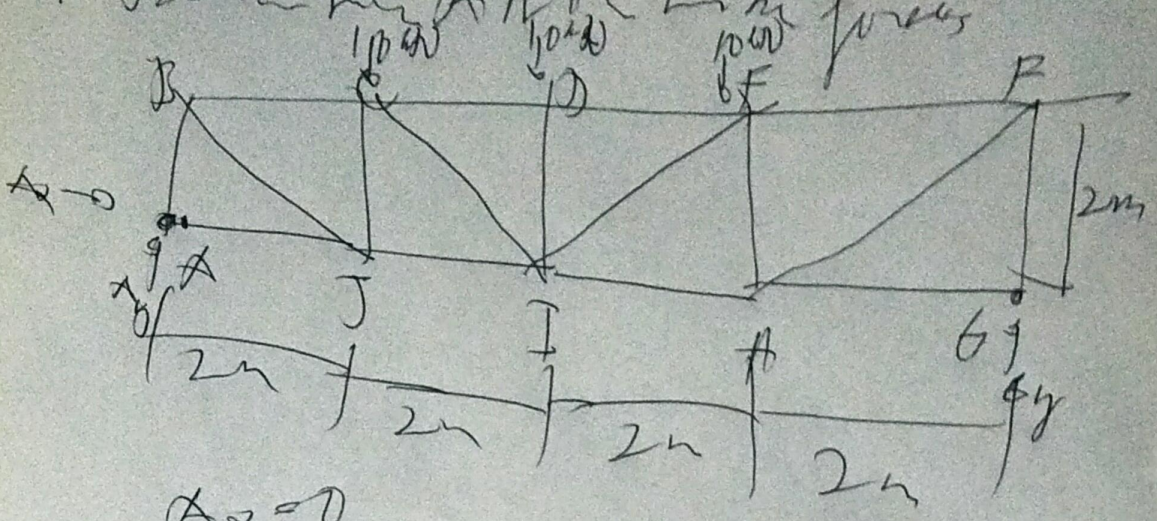
1. Determine the zero force members



$A_x = 0$

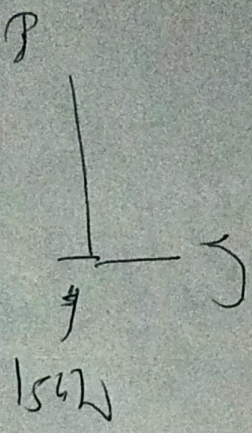
$M_{@A} = 0$:)

$$10(2) + 10(4) + 10(6) - G_y(8) = 0$$

$G_y = 15kN$

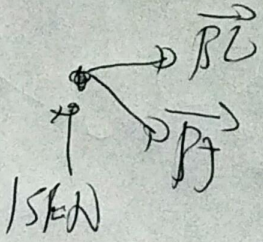
$A_y = 15kN$

对A：



$\vec{A}B = 15kN\ (\circlearrowleft)$

对B：



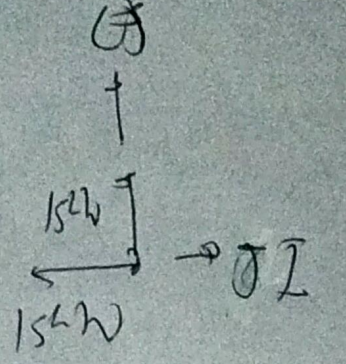
$\cos 45^\circ = \sin 45^\circ = \frac{\sqrt{2}}{2}$

$\sum F_y = 0$：

$15kN - BJ\frac{\sqrt{2}}{2} = 0$ ∴ $BJ = 21.21kN$ (↑)

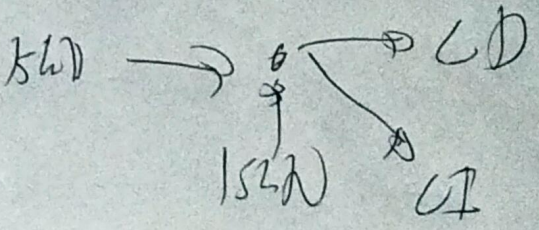
$BJ\frac{\sqrt{2}}{2} = BC$ ∴ $BC = 15kN\ (\rightarrow)$

例 3：



$$T_{AB} = 15kN\ (压)$$
$$T_{AC} = 15kN\ (拉)$$

例 4：



~~$F_x = 0$~~

$F_y = 0$：

$$15kN - T_{AB}\frac{\sqrt{2}}{2} = 0 \quad \therefore \boxed{T_{AB} = 21.21kN\ (压)}$$

$F_x = 0$：

$$15kN + T_{AD} + 21.21kN\cos 45° = 0$$

$$T_{AD} = -30kN$$

$$\boxed{T_{AD} = 30kN\ (压)}$$

DE = 30 kN (C)

EI = 21.21 kN (T)

HI = 15 kN (T)

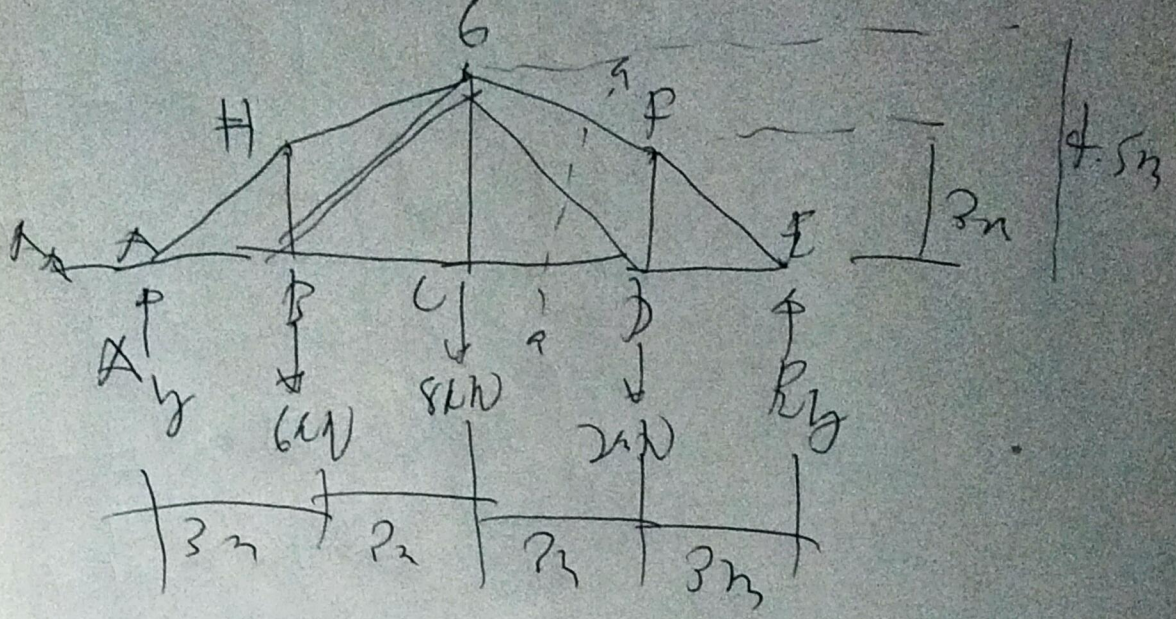
EH = 15 kN (C)

FE = 15 kN (C)

FH = 21.21 kN (T)

FG = 15 kN (C)

2. Determine the bar force @ G
(Method of sections)



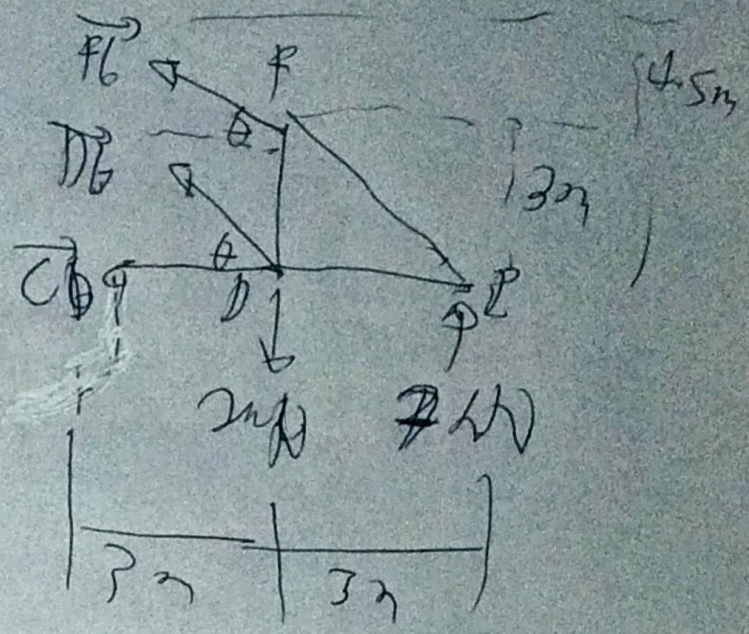
$\curvearrowright \oplus \sum M_A = 0$: +)

$6(3) + 8(6) + 2(9) - E_y(12) = 0$

$\therefore E_y = 7\,kN$

$A_y = 9\,kN$

Section 3-3



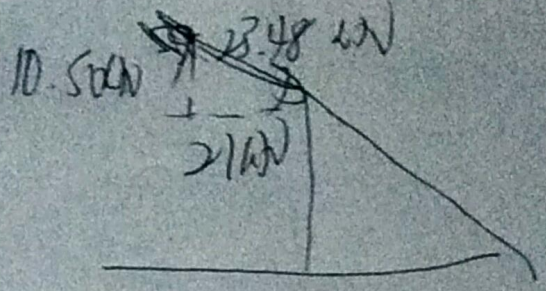
$$\theta_{FG} = \tan^{-1}\left(\frac{(4.5-3)}{3}\right) = 26.57^\circ$$

$$\theta_{DG} = \tan^{-1}\left(\frac{3}{3}\right) = 45^\circ$$

$$\sum M_D = 0:$$

$$F_G \cos\theta_{FG} \cdot (3m) + 4kN(3m) = 0$$

$$F_G = 23.48\,(C) = -23.48$$



$\sum F_x = 0$:

$D_6 \cos\theta D_6 - 21KN = 0$

~~$D_6 = 29.70$~~

$D_6 = 25.70KN$